

ORIGINAL ARTICLE

Two newly recorded genera and a new species of Thripinae from China (Thysanoptera: Thripidae)

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Abstract A new species, *Bregmatothrips sinensis* Wang & Tong, **sp. nov.**, is described and illustrated, and two species of newly recorded genera in Thripinae, *Caprithrips insularis* Beshear and *Paithrips circularis* Nonaka & Jangvitaya, are reported from China. The type materials and specimens examined are deposited in the Insect Collection, South China Agricultural University (SCAU).

Key words Thrips, new species, *Bregmatothrips*, *Caprithrips*, *Paithrips*, China.

1 Introduction

The family Thripidae is currently interpreted as comprising rather more than 2000 described species, these being arranged into four subfamilies: Dendrothripinae, Panchaetothripinae, Sericothripinae and Thripinae. With more than 1700 species in over 230 genera (Thrips Wiki, 2016), Thripinae is the largest subfamily of Thripidae. Members of Thripinae feed both in flowers and on leaves, and some of these are the most common pest species and tospovirus vectors on crops, such as *Thrips palmi* and *Frankliniella occidentalis*. As with all Thysanoptera groups, most genera and species of Thripinae are found in the tropics and subtropics. Although over 200 species of 61 genera in this subfamily have been recorded in China (Mirab-balou & Tong, 2011; Mirab-balou *et al.*, 2011, 2012, 2013, 2014; Xie *et al.*, 2012; Tong *et al.*, 2015), many unknown species of Thripinae have been found during recent surveys on the thrips fauna in southern China. In this study, we describe a new species of the genus *Bregmatothrips* and two newly recorded genera of Thripinae from China.

2 Materials and methods

The thrips were collected by beating vegetation over a white plastic tray using a small stick, and then removed with a fine brush into collection vials contained 90% ethanol. The specimens were then mounted onto slides in Canada balsam using the methods by Mound (1999) and Zhang *et al.* (2006). Mounted structures were examined and photographed under a ZEISS Imager A1 microscope with a CoolSNAP digital camera, and the figures were subsequently processed with Adobe Photoshop CS5®. All specimens examined, including types, are deposited in the Insect Collection, South China Agricultural University (SCAU), Guangzhou, China.

3 Taxonomy

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3.1 *Bregmatothrips* Hood, 1912

Bregmatothrips Hood, 1912: 66. Type species: *Bregmatothrips venustus* Hood, 1912, by original designation.

Diagnosis. Female. Head longer than wide, with 3 pairs of ocellar setae; head projecting in front of compound eyes. Antennae 7–8 segments, segment I with 1 or 2 dorso-apical setae, segments III and IV with simple or forked sensoria. Maxillary palps 2- to 3-segmented. Pronotum weakly trapezoidal with 2 pairs of posteroangular setae, notopleural sutures extending along lateral margins. Prosternal ferna complete medially; meso and meta furcae without spinula. Tarsi 2-segmented. Abdominal tergites I–VIII with campaniform sensilla close to posterior margin and short lobes or teeth (often restricted to sides) or with continuous posteromarginal flange along the posterior margin; sternite VII with setae S1 arising at posterior margin or sub-marginally.

Male. General structure similar to female, body color usually bicolored or similar to female. Abdominal sternites without gland areas.

Bregmatothrips sinensis Wang & Tong, sp. nov. (Figs 1–7)

Description. Female macroptera (Fig. 1). Body brown, all femora brown, fore tibiae yellow shaded with light brown in basal third, mid tibiae brown with yellow in distal 1/5, hind tibiae brown with yellowish brown in distal 1/8, and all tarsi yellow; antennal segments III–V clear yellow, I–II and VI–VIII brown; fore wing white with a grey band in 1/3 medially; major setae on body light brown.

Head longer than wide (Fig. 2), about 1.2 times as long as width; head slightly projecting in front of compound eyes, cheeks almost parallel; three pairs of ocellar setae present, pair I separated, pair III situated outside the triangle just posterolateral to fore ocellus; compound eyes not prolonged ventrally, with 5 pigmented ommatidia ventrally and laterally; 4–5 pairs of postocular setae present, but setae I absent, setae II arise far to posterior; vertex distinctly sculptured with many transverse lines medially and posteriorly; mouth cone large and extending between fore coxae, maxillary palps 2-segmented. Antennae 8-segmented; segment I with only one dorso-apical seta (Fig. 3); sensorium on III–IV simple; IV with 5 setae plus one subsidiary sensorium dorsolaterally; segments III–V each with 3–4 rows of sparse microtrichia.

Pronotum (Fig. 2) slightly trapezoidal, notopleural sutures extending along lateral margins; 2 pairs of posteroangular setae present, inner pair (=setae I) longer than outer pair; 3 pairs of posteromarginals, innermost pair longest; dorsal surface almost smooth, but with transverse sculpture lines anteriorly and posteriorly. Mesonotum (Fig. 5) with transverse sculpture, anterior campaniform sensilla absent; one pair of setae anterior to second pair near posterior margin, lateral setal pair minute. Metanotal median area reticulate, without campaniform sensilla, median setae close to anterior margin (Fig. 5). Prosternal ferna complete medially (Fig. 4); mesothoracic sterno-pleural sutures complete; meso and meta furcae without spinula (Fig. 4). Tarsi 2-segmented. Fore wing first vein with about 7 setae in basal half, 2 setae near apex; second vein with 8–9 setae; clavus with 4 veinal and one discal setae.

Abdominal tergite I weakly reticulate, II–VIII with no sculpture medially except near anterior margin and laterally; I–VIII with campaniform sensilla close to posterior margin, II–VIII with pale, translucent craspedum of small lobes; pleurotergites slender; tergite IX with 2 pairs of campaniform sensilla; tergite X longitudinally reticulate with dorsal split complete (Fig. 6). Sternites without discal setae and craspeda, sternites I–VII with 3 pairs of posteromarginal setae, but sternite VII with setae S1 arising in front of posterior margin (Fig. 7).

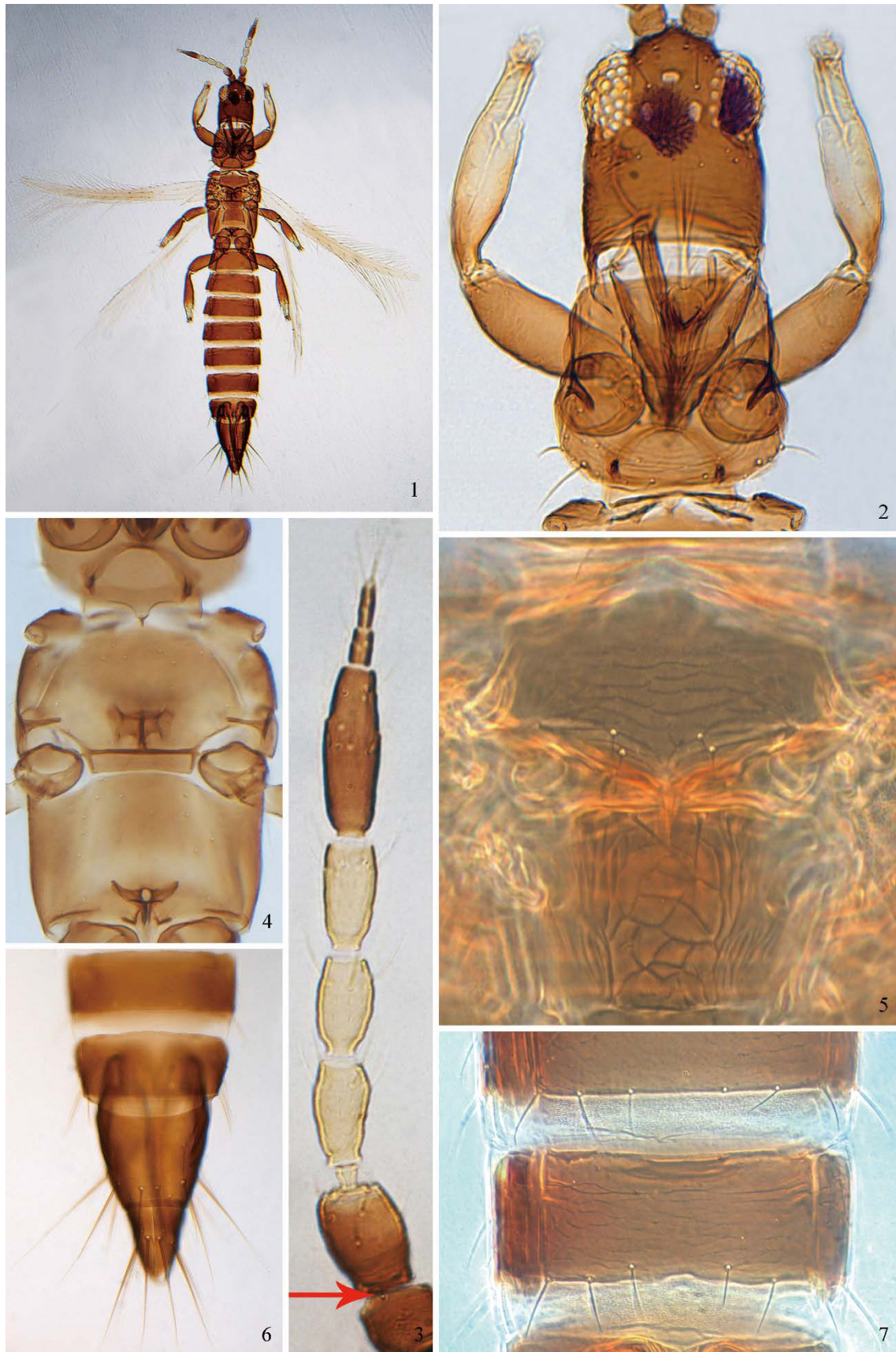
Measurements (holotype female in microns). Body length 1860. Head, dorsal length 182; ventral length to mouth cone tip 336; width across compound eyes 169; ocellar setae III 63. Pronotum, length 183; maximum width 220; posteroangular inner setae 65; posteroangular outer setae 47. Metanotal median setae 32. Tergite IX setae S1 118; S2 177. Tergite X setae S1 169. Length of antenna 270; length (width) of antennal segments I 22(34), II 39(32), III 45(21), IV 37(21), V 35(21), VI 60(21), VII 13(9) and VIII 18(6). Fore wing length 860.

Male. Unknown.

Material examined. Holotype. ♀, China, Guangdong, Shenzhen, Mt. Wutongshan (22°34'13"N, 114°11'25"E; elev. 600 m), collected from grass, 30 May 2014, leg. Zhaohong Wang. Paratypes. 2♀, same data as the holotype; 1♀, Guangdong, Gaozhou City, Yuntan Town, Mt. Sanguanshan (21°55'10"N, 111°8'40"E; elev. 600 m), collected from grass, 5 September 2015, leg. Zhaohong Wang; 1♀, Guangxi, Jiuwanshan National Nature Reserve, Yangmeio (25°11'26"N, 108°38'34"E; elev. 1160 m), collected from grass, 25 July 2015, leg. Zhaohong Wang; 1♀, Fujian, Wuyishan National Nature Reserve, Aotou (27°40'N, 117°38'E; elev. 970 m), 24 August 1980, leg. Bangkai Huang. All type specimens deposited in SCAU.

Distribution: China (Guangxi, Guangdong, Fujian).

Etymology. The specific epithet, *sinensis*, is from the Latin word, meaning Chinese.



Figures 1–7. *Bregmatothrips sinensis* Wang & Tong, **sp. nov.** 1. Habitus of female. 2. Head and pronotum. 3. Antenna. 4. Ventral view of thorax. 5. Meso- and metanotum. 6. Abdominal tergites VII–X. 7. Abdominal sternites VI–VII.

Remarks. This new species is similar to *Bregmatothrips australis* Mound by sharing antennal segments III–V clear yellow, the sensorium on antennal segments III–IV simple and abdominal sternite VII with setae S1 arising ahead of posterior margin (Fig. 7), but it can be readily distinguished from the latter by the following combination of characteristics: 1) antenna with clearly 8 segments (Fig. 3) (antennae 7-segmented but VII sometimes with partial suture in *B. australis*); 2) antennal segment I having only one dorso-apical seta and IV bearing 5 setae (Fig. 3) (two dorso-apical setae and 4 setae in *B. australis*); 3) fore wing white with a gray band in mesal third (Fig. 1) (fore wing pale in *B. australis*); 4) fore tibiae yellow shaded with light brown in basal third, mid- and hind tibiae largely brown (Figs 1–2) (all tibiae yellow in *B. australis*). The new species is also closely related to *B. binervis* (Kobus). However, in *B. binervis*, antennal segment I has two dorso-apical setae, segments III–IV bear a forked sensorium, and the fore wing is uniformly pale brownish yellow or colorless, judging from the available key to world species (Mound, 2011). *B. dimorphus* is the only known species of the genus in China (Han, 1997) prior to this study, it mainly differs from the new species by the antennal segment I has two dorso-apical setae, maxillary palps 3-segmented and abdominal sternite VII with setae S1 arising at posterior margin.

3.2 *Caprithrips* Faure, 1933 New record to China

Caprithrips Faure, 1933: 12. Type species: *Caprithrips analis* Faure, 1933, by original designation and monotypy.

Bandamia zur Strassen, 1965: 16. Type species: *Aptinothrips melanophthalmus* Bagnall 1927, by monotypy. Synonymised by Bhatti, 1973: 475.

Diagnosis. Female. Body slender and apterous. Head produced in front of compound eyes, with 3 pairs of dorsal interoculars setae, ocelli absent. Antennae 6–8 segments, segment I without dorsal apical setae, segments III and IV with simple sensoria. Maxillary palps 2- to 3-segmented. Pronotum about as long as broad or broader. Basantra membranous or semimembranous; fernal sclerites enlarged, separate or fused. Mesoepimeron usually with granulate surface. Mesonotum separated from metanotum by a complete suture, or the suture lacking in median half of the width; Meso- and metafurca absent spinula. Tarsi 2-segmented. Abdominal tergites I–VIII usually with posteromarginal craspeda; sternites II–VII usually with posteromarginal craspeda; tergite X with median slit.

Male. General structure and color similar to female, but tergite IX with a pair of strong drepana, tergite X without median slit; abdominal sternites III–VIII each with a transverse gland area.

Caprithrips insularis Beshear (Figs 8–15)

Caprithrips insularis Beshear, 1975: 500.

Female. Body small and largely yellow (Fig. 8), but tip of abdominal tergite X light brown. Antennal segments I–IV yellow, V light brown in distal half, VI dark brown (Fig. 10).

Head bulged in front of compound eyes with weakly discrete transverse lines between and behind eyes, cheeks almost parallel; three pairs of ocellar setae present, pair I not close together, pair III longest (Fig. 9); four pairs of postocular setae present, setae I absent, setae II arise far to posterior. Antennae 6-segmented, segment I without dorso-apical setae, III–IV each with a simple sensorium.

Pronotum slight trapezoidal, wider than long; dorsal surface weakly sculptured with discrete transverse striae and absent strong setae. Suture between meso- and metanotum incomplete, missing in median half (Fig. 12); meso and meta furcae without spinula (Fig. 11). Basantra membranous with 3 pairs of setae; each fernal sclerite transversely long ovoid. Mesoepimeron with granulate surface.

Abdominal tergites I–VIII and sternites II–VII with distinctly posteromarginal craspeda (Figs 13–15) but absent in the mesal third of sternite VII (Fig. 14). Tergites I–VIII with 3 pairs of posteromarginal setae; mediodorsal setae on tergite IX shorter but stouter than posteromarginal setae. Sternite II with 2 pairs of posteromarginal setae, sternites III–VII with 3 pairs of well-developed posteromarginal setae and 7–10 accessory setae (Figs 14–15).

Material examined. 42♀, China, Guangdong, Gaozhou City, Yuntan Town (21°52'42"N, 111°10'24"E; elev. 60 m), collected from grasses, 8 September 2014, leg. Zhaohong Wang; 12♀, same location and host plant, 16 Dec. 2014, leg. Zhaohong Wang; 4♀, Hainan, Danzhou, Campus of Haikou University (19°30'34"N, 109°29'26"E; elev. 150 m), collected from *Cyperus* sp. 27 September 2014, leg. Shulan Yang & Junyu Chen.

Distribution. China (Guangdong, Hainan); USA, Trinidad, Surinam, New Caledonia, Australia.

Remarks. *Caprithrips* is a small genus of six apterous species that all feed on Poaceae (Bhatti, 1980; Mound, 2011; Thrips Wiki, 2016). This genus may be closely related to two other grass inhabiting genera *Aptinothrips* and *Prosopothrips*. However, *Caprithrips* can be distinguished from *Aptinothrips* by posteromarginal flange on abdominal tergites and sternites. *Prosopothrips* has an extensive stippled area around the spiracle on abdominal tergite VIII and reticulated sculpture on body

(Bhatti, 1973), which can be easily separated with *Caprithrips*. The genus is recorded to China for the first time. *Caprithrips insularis* Beshear shows a remarkable disjunct distribution: Western Hemisphere, Australia and China. We have collected almost 60 specimens of the species from three different populations, but no male was found. This species was probably introduced to China with cultivated grasses from other countries.



Figures 8–15. *Caprithrips insularis* Beshear. 8. Habitus of female. 9. Head. 10. Antenna. 11. Ventral view of thorax. 12. Meso- and metanotum. 13. Abdominal tergites IV–V. 14. Abdominal sternite VII. 15. Abdominal sternites V–VI.

3.3 *Paithrips* Nonaka & Jangvitaya, 1994 New record to China

Paithrips Nonaka & Jangvitaya, 1994: 46. Type species: *Paithrips circularis* Nonaka & Jangvitaya, 1994.

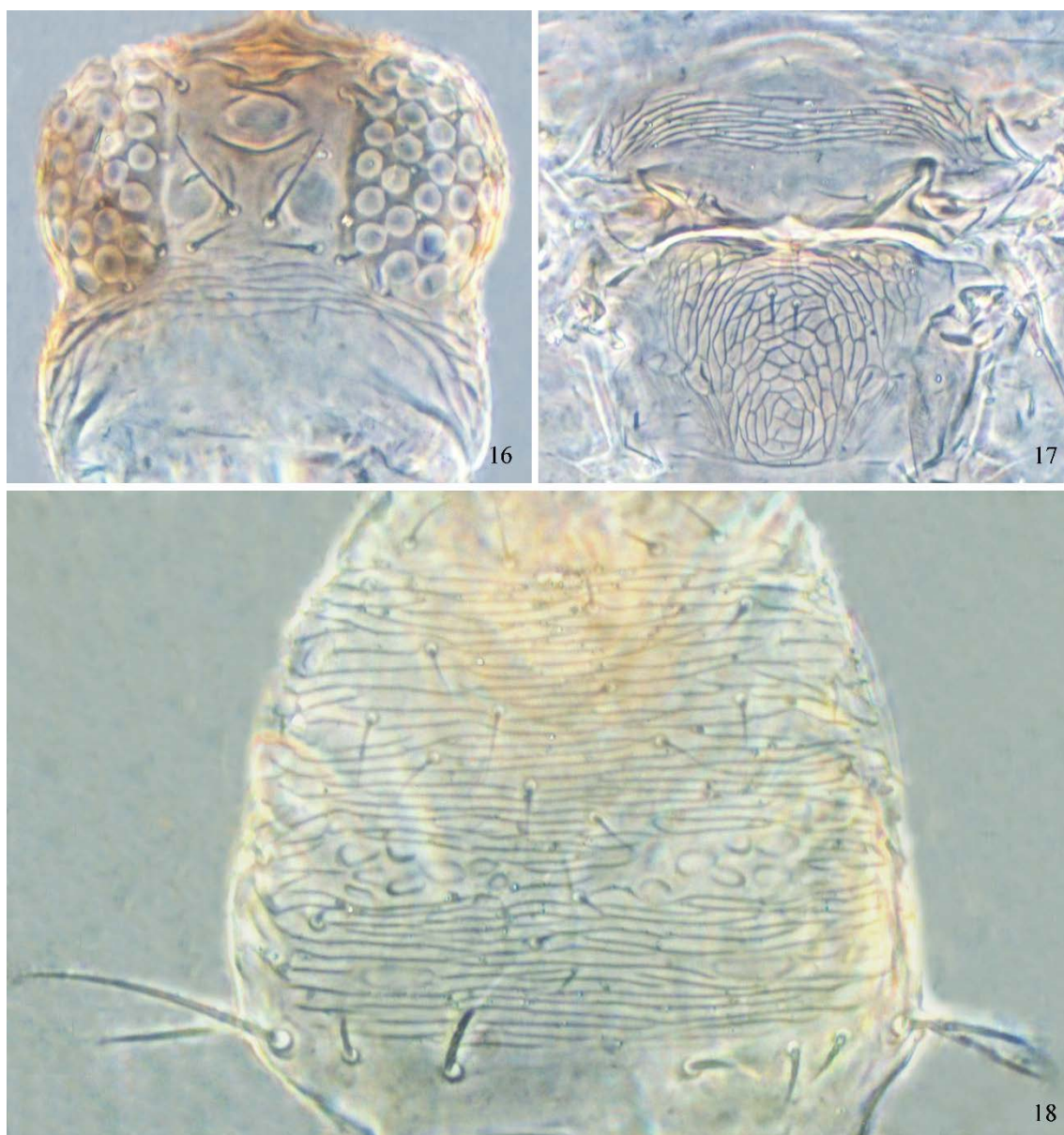
Diagnosis. Female. Head wider than long; ocellar setae 2 pairs, setae I absent, setae III usually close to posterior margin of hind ocelli. Maxillary palps 3-segmented. Antennae 8-segmented, segment I with 2 dorso-apical setae, segments III and IV with forked sensoria. Pronotum weakly trapezoidal, dorsal surface distinctly sculptured with transverse lines, with some small circles posterior third; posteroangular setae 2 pairs. Meso- and metanotum without CPS. Mesofurca with spinula, metafurca without spinula. Fore wing fully developed. Tarsi 2-segmented. Abdominal tergites without ctenidia and posteromarginal craspeda; posteromarginal comb absent on tergite VIII; tergite X without median slit; sternites without posteromarginal craspeda and discal setae; sternites II–VII with 3 pairs of posteromarginal setae.

Male. Similar to female. Sternites III–VIII each with some scattered small pore plates.

Paithrips circularis Nonaka & Jangvitaya (Figs 16–18)

Paithrips circularis Nonaka & Jangvitaya, 1994: 47.

Female. Body largely yellow, but head light brown; antennal segments I, apical half of VI and V brown, the remaining



Figures 16–18. *Paithrips circularis* Nonaka & Jangvitaya. 16. Head. 17. Meso- and metanotum. 18. Pronotum.

yellow. Fore wing light brown with 3 pale areas.

Head (Fig. 16) wider than long with transverse lines posteriorly, slightly constricted just behind compound eyes; cheeks slightly rounded; ocellar setae III longer than II, situated at posterior margin of ocellar triangle; postocular setae I and II are sub-equal in length, longer than setae III and IV. Mouth-cone short and rounded.

Pronotum longer than head, sculptured with distinctly transverse anastomosing striae on dorsal surface, along with some small circles near lateral margin in posterior third (Fig. 18); two pairs of posteroangular setae well developed, inner pair longer than outer pair; two or three pairs of anteromarginal setae often very long; three pairs of posteromarginal setae present. Mesonotum sculptured with transverse anastomosing lines medially (Fig. 17); metanotum distinctly reticulated, median pair of setae behind anterior margin (Fig. 17). Fore wing first vein with 7 basal setae, 2–3 apical setae, posteromarginal cilia wavy.

Abdominal tergites II–VIII weakly sculptured with transverse lines anteriorly, tergite VIII without posteromarginal comb, tergite X without median slit.

Material examined. 1♀, China, Hainan, Wanning City, Niulou Town (18°46'N, 110°15'E; elev. 30 m), collected from *Averrhoa carambola* L., 27 November 2014, leg. Junyu Chen.

Distribution. China (Hainan); Thailand, Vietnam, Malaysia.

Remarks. The genus *Paithrips* was established by Nonaka and Jangvitaya in 1994 with the type species *Paithrips circularis* from Malaysia and Thailand. Later, Masumoto and Okajima (2012) described a second species in the genus from Vietnam. This genus is similar to the genus *Okajimaella*, but it can be separated from the latter by the dorsal surface of pronotum apparently sculptured with transverse lines and abdominal tergite IX with a pair of posteromarginal drepanae (Nonaka & Jangvitaya, 1994). *Paithrips* is newly recorded from China in this study. The generic epithet “*pai*” is the meaning of bamboo in Thai and refers to the species of *Paithrips* mainly inhabiting in bamboo (Nonaka & Jangvitaya, 1994). However, *Paithrips circularis*, the single specimen recorded here, was collected from the leaf of starfruit.

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